

Georgia Department of Natural Resources

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Mark Williams, Commissioner

Environmental Protection Division

Judson H. Turner, Director

Land Protection Branch

Keith M. Bentley, Branch Chief

404-657-8600

July 16, 2012

VIA E-MAIL AND REGULAR MAIL

Thermo King Corporation
c/o Mr. David A. Kolb, ESH and Facility Manager
1430 Highway 24 East
Louisville, Georgia 30434

COPY

Re: June 16, 2011 Transmittal of the Affidavit to the Property Deeds
September 9, 2011 Voluntary Remediation Plan Status Report No. 1
March 9, 2011 Voluntary Remediation Plan Status Report No. 2
Thermo King Corporation Site, HSI Site No. 10702
Louisville, Jefferson County, Georgia
Tax Parcel 0090-024

Dear Mr. Kolb:

The Georgia Environmental Protection Division (EPD) has reviewed the referenced documents submitted by Amec Environment & Infrastructure, Inc. in accordance with the Georgia Voluntary Remediation Program Act (the Act) for the Thermo King property. EPD has the following comments which should be addressed pursuant to the Act:

June 16, 2011 Transmittal of the Affidavit to the Property Deeds

1. EPD received the June 16, 2011 Transmittal of the Affidavit to the Property Deeds notice. Condition 5 of EPD's March 10, 2011 letter has been met.

September 9, 2011 Voluntary Remediation Plan Status Report No. 1

Response to EPD's March 10, 2011 Comments

2. **Response to Comment #5:** EPD disagrees with the statement that there is no continuous groundwater flow path in the Uppermost Zone to Manson Branch. Monitoring wells MW-27 and MW-28 were installed in 2010 to address a groundwater data gap between the seeps and Manson Branch. Stagnant water levels have been measured consistently in 2010, 2011, and 2012. Additionally, laboratory results of groundwater samples collected from MW-27 and MW-28 show low concentrations of TCE and breakdown products. Although the Uppermost Zone daylights in seeps along the hill slope east of Manson Branch, static water level measurements and detections of contaminants in MW-27 and MW-28 indicate there is a connection between the Uppermost Zone and Manson Branch. Appendix D of the December 2010 Addendum to VRP states that near surface groundwater in the colluvial/alluvial deposits, where MW-27 and MW-28 are installed, appears to discharge directly into Manson Branch. Therefore, EPD requests a revised Conceptual Site Model with these data be submitted. In reference to Figure 4.1, Hydrogeologic Profile A-A', from the December 2010 Addendum to VRP, stagnant water level is shown in MW-27; however, there is no interpretation as to the connection of the water table at MW-27, the seeps, and the Uppermost Zone. The position of the water table often follows the general shape of the topography. Therefore, EPD requests a revised cross-section with water table elevation interpretation. EPD recommends stretching the horizontal scale to provide more detail of the topography from MW-19 to Manson Branch.
3. **Response to Comment #6:** Because of the difficult geology of the Uppermost Zone, Amec states it is not feasible to develop a fate and transport model similar to that used to model the Intermediate Zone to directly predict potential contaminant concentrations at wells MW-

27/MW-28 or impacts to Manson Branch. Response to Comment #6 states monitoring of contaminant concentrations will continue in wells MW-5, MW-19, MW-27, MW-28, seeps Manson Branch #2 (and Seep H), as well as Manson Branch to confirm that constituents in groundwater remain at levels that will not result in impacts to Manson Branch that exceed ISWQS. Near surface groundwater in the colluvial/alluvial deposits discharges directly into Manson Branch. TCE and breakdown products have been detected in monitoring wells MW-27 and MW-28, adjacent to Manson Branch. Therefore, in order to refine the conceptual site model, to protect Manson Branch from the discharge of contaminated groundwater, and to determine if there is a complete pathway to a receptor, it must be determined whether Manson Branch is a gaining or losing stream. If Manson Branch is a gaining stream, then the groundwater to surface water discharge mechanism(s) must be determined.

Identifying physical features in Manson Branch indicative of groundwater discharge may provide useful information. EPD refers you to Section 1.2 Groundwater and Contaminant Discharges in Transition Zones of the USEPA ECO Update/Ground Water Forum Issue Paper *Evaluating Ground-Water/Surface-Water Transition Zones in Ecological Risk Assessments* (EPA-540-R-06-072), which can be downloaded from the following website: http://www.epa.gov/oswer/riskassessment/ecoup/pdf/eco_update_08.pdf.

Temperature is a good measure to determine areas of potential groundwater discharge. Areas of water gain, where groundwater discharges to the creek, should show a distinct change in temperature of both surface water and shallow sediment. EPD recommends monitoring temperature at intervals along the creek and collecting temperature data at: 1) the center of the flow channel at the bottom of the flow stream; 2) 3-inches below the top of the sediment in the center of the flow channel; 3) 3-inches below the top of the sediment next to the west bank; and 4) any other physical features identified as possible groundwater discharge areas. Where an area of localized temperature change is identified, mini-piezometers should then be installed to identify head differential between the water level in the mini-piezometer and water elevation in the creek. If Manson Branch is a gaining stream and groundwater discharge areas are identified, pore water/interstitial sampling should be conducted in the areas where the stream is gaining and those samples should be analyzed for total VOCs (USEPA SESD Pore Water Sampling Operating Procedure, SESDPROC-513-R0, February 2007, <http://www.epa.gov/region04/sesd/fbgstp/Porewater-Sampling.pdf>).

4. Response to Comment #9 is acceptable.
5. Response to Comment #10: The Type 2 and Type 4 groundwater RRS for cis-1,2-dichloroethylene shown in Table B-2 are correct. EPD cannot verify the Type 2 and Type 4 soil leaching RRS of 0.44 mg/kg for cis-1,2-DCE shown in Table B-1. Tables K-6a and K-6b have not been updated with the revised cis-1,2-DCE Type 2 and Type 4 groundwater RRS. Additionally, EPD cannot verify the Type 2 leaching number of 0.94 mg/kg for chloroform in Table B-1. There may have been a transcription error. The Type 2 number of 0.94 mg/kg in Table K-6a is for cis-1,2-DCE. Table K-6a shows the Type 2 and Type 4 leaching number of 0.44 mg/kg for chloroform, which is correct for chloroform. Please revise accordingly.
6. Response to Comment #11 is acceptable.
7. Response to Comment #16: The presence of a public right-of-way does not cause a property to be geographically discontinuous, in accordance with the Georgia Rules for Hazardous Waste Management, §391-3-11-.02 "Definitions," which adopts and incorporates by reference, 40 CFR §260.10. Therefore, EPD requires all properties across Highway 24 be included in the environmental covenant as adjacent property owners.

Fate and Transport Modeling

8. Additional information must be submitted to justify the model inputs, which includes, but is not limited to, the following:
 - a. A summary table of all model input and calibration parameters and their respective sources and/or bibliographical references must be submitted. A summary table must also be submitted for each model run.
 - b. Seepage velocity: Section C2.1 states seepage velocity used in the model is 1.57×10^{-4} cm/s or 16.2 ft/yr. EPD also calculates a seepage velocity of 16.2 ft/yr, which is 1.57×10^{-5} cm/s.
 - c. Dispersivity: An isoconcentration map showing the estimated length of the longest COC plume for the longitudinal dispersivity value must be provided.
 - d. Koc: Organic carbon partition coefficients (Koc) used to calculate the retardation factor were obtained from the January 2000 Biochlor manual. EPD requests using updated Koc values for regulated substances provided in the Region 9 Regional Screening Level (RSL) Chemical-specific Parameters Supporting Table, May 2012.
 - e. Foc: The fraction organic carbon (Foc) of 0.002 in EPA's July 1996 Soil Screening Guidance: User's Guide is for soil. The retardation factor is very sensitive with respect to the Foc. According to the Biochlor User's Manual, the Foc value should be measured by collecting a sample of aquifer material from an uncontaminated area. If unknown, a default value of 0.001 should be used.
 - f. Modeled area length and width: According to the Biochlor User's Manual, the plume length should be slightly larger than the final plume dimensions or should extend to the downgradient point of exposure. Modeled area length must be adjusted to demonstrate the maximum extent the plume will travel. Because the wells modeled in the Intermediate Aquifer are not exactly downgradient from one another, a description of how the distances from the source were determined must be provided. A plume map showing the source and the contaminant migration line to justify these distances must be provided.
 - g. Source area concentration: The source of contamination for the Intermediate Aquifer most likely migrated from the South Settling Pond and through the Uppermost Aquifer. If MW-14 is going to be located 5' downgradient of the source, then the highest concentration of TCE detected in the Uppermost Aquifer (20,000 µg/L at MW-19) is recommended for the source concentration. Due to the uncertainty in determining dates of undocumented releases, EPD suggests using the date of the closure of the South Settling Pond, estimated to be 1983 as stated in the March 2007 CSR. Using 1983 as an initial release date would provide a conservative estimate. The calibration model run time would be 18-years using a source concentration of 20,000 µg/L, which was detected in 2004. Groundwater data from MW-14, MW-20, and MW-22 could then be used to calibrate the model.
 - h. Source area width and thickness: A map with isoconcentration contours justifying source dimensions for the date the model was calibrated to must be provided. A line must be drawn on the isoconcentration maps showing the source plane. A cross-section must also be provided demonstrating how the source area thickness was determined.
9. Model Calibration: The Biochlor model provided does not appear to be well calibrated and model input parameters should be adjusted accordingly. Section C2.4 states that June 2011 groundwater data for monitoring wells MW-14, MW-25, MW-20, and MW-22 were used for model calibration. The biotransformation rate constants were determined by Biochlor

Version 2.2, which automatically provides an approximate calibration of the model to entered site-specific field data. During calibration, the initial rate constants were slightly adjusted to better match the field concentrations. The predicted concentrations do not match site-specific field data. It is important for the source and POD well to have a best fit match. In the March 10, 2011 letter, EPD requested the model be calibrated with historical data for monitoring wells MW-14, MW-20, and MW-22 and plot the location of MW-25 on the Distance vs. Concentration plot to compare the projected concentration of MW-25 versus the actual data to determine how well the model is calibrated. Historical data for these three wells could be used to calibrate the model while manually adjusting the biotransformation rate constants. The following years of data could be used to validate the model. Then starting with year 2010, MW-25 data could be used for continuing model validation and adjusting model parameters.

10. EPD recommends additional data points for modeling the groundwater plume in the Intermediate Aquifer. There are no data points between MW-20 and MW-22; MW-22 is located approximately 1000' downgradient of MW-20. Additionally, MW-22 has historically been non-detect.
11. Sensitivity Analysis: Sensitivity analyses were conducted for four input parameters: hydraulic conductivity, longitudinal dispersivity, retardation factor, and biotransformation half-life. Sensitivity analyses must be conducted for *each* model input parameter. EPD requests the submittal of a summary table of sensitivity analysis parameters showing the input values, the source of the input values, the model output concentrations downgradient of the source, and the percent change in the concentration as the target input parameters are varied (i.e., high or 1.5x baseline, low or 0.5x baseline). To demonstrate the model's sensitivity to each parameter, EPD recommends generating a sensitivity analysis spider diagram by plotting percent change from baseline for all sensitivity parameters on the x-axis and resulting downgradient concentrations when each parameter is perturbed on the y-axis. The steeper the slope of the line, the more sensitive the model is to that parameter. EPD also recommends conducting the sensitivity analysis on a source area well, such as MW-14, as opposed to the POD well that has historically been non-detect. Additionally, based on Table C4, the source decay constant may be a sensitive parameter. The baseline concentration for TCE is orders of magnitude higher than the observed concentration, while the baseline concentrations for cis-1,2-DCE and vinyl chloride are closer to the observed concentrations.
12. EPD requested projecting the calibrated model forward in time to estimate the maximum distance the plume is expected to travel and continue projecting forward to estimate when the plume retreats and generate concentration vs. distance plots to compare model prediction with field data. The model shows the maximum distance the cis-1,2-DCE plume will migrate is 200' beyond the property line. The model shows the maximum distance the vinyl chloride plume will migrate is 100' beyond the property line. Once the model is calibrated and validated, these projection runs will need to be resubmitted. If the model shows contamination migrating onto the downgradient property, this property will need to be addressed under the VRP or HSRA.
13. According to the laboratory data sheets, 4-isopropyltoluene was detected in Manson Branch Seep West #2 (4.5 µg/L) and Seep I (1.4 µg/L); however, these detections were not listed in Table 3 Summary of Detected Constituents in Seeps and Surface Water. For the next Status Report, the table must be revised to reflect all detected constituents.

March 9, 2011 Voluntary Remediation Plan Status Report No. 2

14. The text on page 3-1 states 1,4-dioxane was analyzed using selective ion monitoring and USEPA Method 8260B to achieve a lower quantitation limit. However, EPD noted the reporting limit for 1,4-dioxane for some samples was 100 µg/L instead of the lower reporting

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Thermo King Corporation
July 12, 2012
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limit of 2 µg/L. For example, MW-10 and MW-22 reported <100 µg/L for 1,4-dioxane. Other results reported for these wells were at concentrations of 2.9 µg/L or less indicating these samples were not diluted. Additional information regarding the elevated reporting limit for 1,4-dioxane must be provided.

15. The Status Reports must include paper copies of data input and output worksheets and a summary table of input parameters and references for each groundwater model run.
16. For future groundwater sampling events, the depth of the pump intake must be provided on the groundwater field sampling reports.
17. Please provide a copy of the January 11, 2012 USACE Nationwide Permit (NWP) No. 38 and associated correspondence. Please copy EPD on future correspondence with the USACE.

Please address the comments in this letter in the next semiannual status report due September 10, 2012. If you have any questions, please contact Kristen Ritter Rivera, P.G. of the Response and Remediation Program at (404) 657-8663.

Sincerely,



David Brownlee
Acting Program Manager
Response and Remediation Program

c: David Sordi, Ingersoll Rand, via email
Greg Wrenn, P.E., Amec, via email

File: 10702

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